Claims:

What is claimed is:

1. A quantum well infrared photodetector comprising:

a plurality of doped quantum well layers forming a multi-quantum well structure for providing high absorption at temperatures other than low temperatures; and,

contact layers for receiving current from the plurality of quantum well layers.

2. A quantum well infrared photodetector according to claim 1 wherein the multi-quantum well structure is for providing high absorption at temperatures near room temperature.

3. A quantum well infrared photodetector according to claim 2 wherein the plurality of doped quantum well layers includes more than 10 quantum well layers.

4. A quantum well infrared photodetector according to claim 3 wherein the dopant concentration is selected to be sufficiently large for high absorption during near room temperature operation.

5. A quantum well infrared photodetector according to claim 4 wherein the doping density (Nd) is given by $Nd=(m/\pi\leftarrow^{2})(2k_{B}T)$, where m is the effective mass, $\leftarrow$ is the Planck constant, k_B is the Boltzmann constant, and T is the desired operating in degrees K.

6. A quantum well infrared photodetector according to claim 5 wherein the well material is GaAs, the barrier material is Al GaAs, and the operating temperature is room temperature and Nd is in the range of 1 – 2E12 cm^{-2}.

7. A quantum well infrared photodetector according to claim 6 wherein the contact layers are formed of GaAs doped with Si to a concentration of 1E17 to 5E18 cm^{-3}.

8. A quantum well infrared photodetector comprising:

a plurality of doped quantum well layers forming a multi-quantum well structure for providing high absorption and dark current at temperatures other than low temperatures; and,

contact layers for receiving current from the plurality of quantum well layers.

9. A quantum well infrared photodetector comprising:

a plurality of quantum well layers formed of a first semiconductor material and doped forming a multi-quantum well structure for providing high absorption at temperatures other than low temperatures and substantial dark current;

barriers between the quantum well layers formed of a second semiconductor material; and,

contact layers comprising a third doped semiconductor.

10. A quantum well infrared photodetector according to claim 9 wherein temperatures other than low temperatures include temperatures at or near room temperature.

11. A quantum well infrared photodetector according to claim 10 wherein the first semiconductor material is GaAs.

12. A quantum well infrared photodetector according to claim 11 wherein the dopant for doping the first semiconductor material is Si.

13. A quantum well infrared photodetector according to claim 12 wherein dopant concentration of the Si is approximately 1 – 2E12 cm^{-2}.

14. A quantum well infrared photodetector according to claim 13 wherein second semiconductor material is Al GaAs.

15. A quantum well infrared photodetector according to claim 14 wherein fraction of Al is from 10%-50%.

16. A quantum well infrared photodetector according to claim 15 wherein the third doped semiconductor material is GaAs doped with Si.

17. A quantum well infrared photodetector according to claim 16 wherein the third doped semiconductor material is doped with Si to a concentration of 1E17 to 5E18 cm^{-3}.

18. A quantum well infrared photodetector according to claim 17 wherein the third doped semiconductor material of a thickness within a range of 0.1-2 μm.

19. A quantum well infrared photodetector according to claim 8 wherein the plurality of doped quantum well layers is designed for operation at frequencies above 1 GigaHz.

20. A quantum well infrared photodetector according to claim 19 wherein the plurality of doped quantum well layers is designed for operation at frequencies above 30 GigaHz.

21. A method of detecting infrared radiation comprising the steps of:
detecting infrared radiation with a quantum well device absent cryogenic cooling; and,
determining an intensity of the detected infrared radiation.

22. A method of detecting infrared radiation according to claim 19 wherein the step of determining comprises the step of:

filtering the dark current component of the detected signal to determine an intensity of the detected infrared radiation.

23. A method of detecting infrared radiation according to claim 19 wherein the step of detecting is performed at or near room temperature